MoCo Recommendation Engine

Machine Learning Models Used

1. K-Nearest Neighbors (KNN)

How It's Used:

- KNN is used to find movies that are similar to the selected movie by calculating the cosine similarity between their feature vectors.
- The model identifies the nearest neighbors to the selected movie and suggests them as recommendations.

Why KNN:

- **Simplicity**: KNN is straightforward and easy to implement.
- **Effectiveness**: It effectively captures the similarity between movies based on features like genres, cast, crew, and overview.
- **Non-parametric**: KNN makes no assumptions about the underlying data distribution, making it versatile.

2. Random Forest Regressor (Using Decision Trees)

How It's Used:

- The Random Forest Regressor is trained to predict the relevance of movies based on their feature vectors.
- It ranks the movies, and the top-ranked ones are recommended to the user.

Why Random Forest:

- **Robustness**: Combines the predictions of multiple decision trees to reduce overfitting and improve generalization.
- **Feature Importance**: Provides insights into the importance of different features in the recommendation process.
- **Accuracy**: Capable of capturing complex interactions between features, leading to more accurate recommendations.

3. Support Vector Machines (SVM)

How It's Used:

- SVM can be used to classify and rank movies based on their feature vectors.

- It finds the hyperplane that best separates relevant and non-relevant movies in the feature space.

Why SVM:

- **High Performance**: Effective in high-dimensional spaces and well-suited for text classification tasks like movie overviews.
- **Robustness to Overfitting**: Especially effective when the number of features is large.
- **Versatility**: Can be used for both classification and regression tasks, making it flexible for different types of recommendation problems.

Conclusion

By integrating KNN, Random Forest Regressor, and SVM, MoCo: Movie Companion ensures that the movie recommendations are accurate, relevant, and personalized. Each model contributes uniquely to the recommendation process, leveraging their individual strengths to provide a comprehensive and robust recommendation system.